Summary:

Several recent studies have assessed potential development and redevelopment opportunities in the "Mercer Crossing" area of Trenton, Ewing, and Lawrence. This Princeton Avenue and Spruce Street traffic study builds upon the previous studies by evaluating circulation system improvements that would support redevelopment in the study area. The main circulation objectives are to maintain traffic flow, increase safety, and provide multi-modal travel options compatible with neighborhood-scale land uses.

This document is a summary of the draft recommendations for circulation system improvements for the Princeton Avenue and Spruce Street corridors. The project team has based these recommendations upon technical analysis, including zoning build-out and traffic network simulation analysis, of highly ranked alternatives suggested by local property owner focus groups. This analysis found that congestion and safety problems currently exist, and build-out of the Spruce Street corridor under existing zoning (highway commercial) would exacerbate these problems. An alternative zoning / land use approach (office and residential) would generate far fewer additional peak hour vehicle trips and would complement a modified 3-lane Spruce Street cross-section. This "complete street" would maintain traffic flow, improve traffic safety, and increase access and safety for pedestrians and bicyclists.

This summary organizes the recommendations using a phasing plan that calls for implementing various improvements based upon access and land use "triggers." For example, actions to consolidate the many driveways in front of the Trenton Farmers' Market and Halo Farm would trigger providing a new traffic signal at a combined driveway in front of these two businesses. And, revising existing zoning from highway commercial to office and / or residential would trigger converting the existing 4-lane corridor to a 3-lane "complete street."

The summary shows that implementing successive phases of improvements at a particular location would require actions such as traffic impact studies and field observations to ensure that the improvements under the previous phase have resulted in acceptable operating performance levels.
The plan has designed the improvements in such a manner that it would be easy to reverse implementation (e.g., revise striping) of a previous phase and revert back to the previous condition with little loss in capital investment.

PRINCETON AVENUE CORRIDOR

Improvement Location: Princeton Ave. & Brunswick Circle Extension

Improvement Trigger:

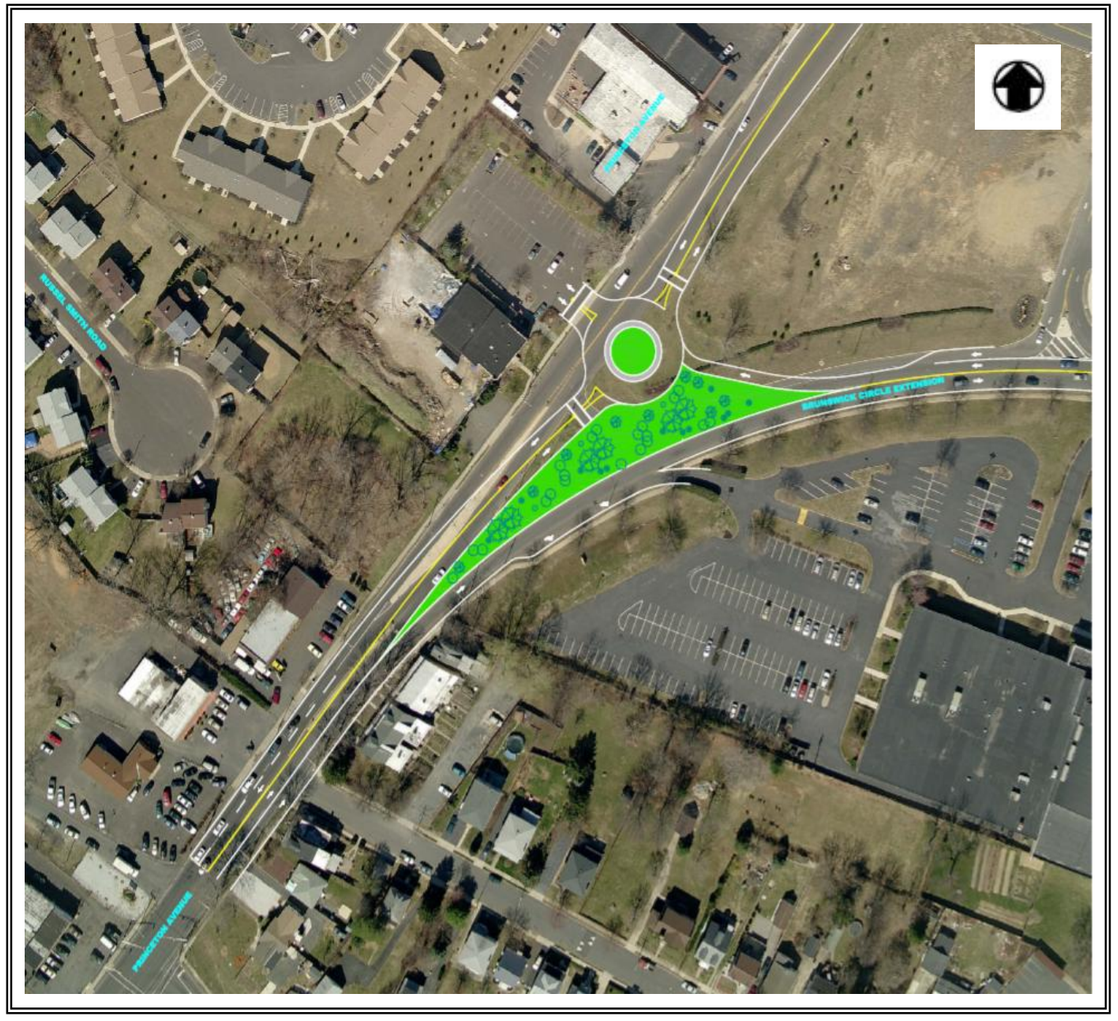
- Substantial development between Brunswick Circle Extension and US 206

Nature of Improvement:

- Install roundabout in location along Princeton Avenue north of existing intersection.

Benefits of Improvement:

- Provision of a roundabout will Improved traffic flow along the corridor.
- Significant improvement in intersection safety can be achieved, especially for the northbound through movement along Princeton Avenue, which currently operates as a stop-controlled movement.
- A roundabout will also serve as an effective traffic calming measure for the corridor.
- It will provide a potential gateway treatment for the study area.



Improvement Location: Princeton Ave. & Mulberry Street/TFM Driveway

Improvement Trigger:

- Substantial development on Trenton Farmers' Market or Choudhry Parcels

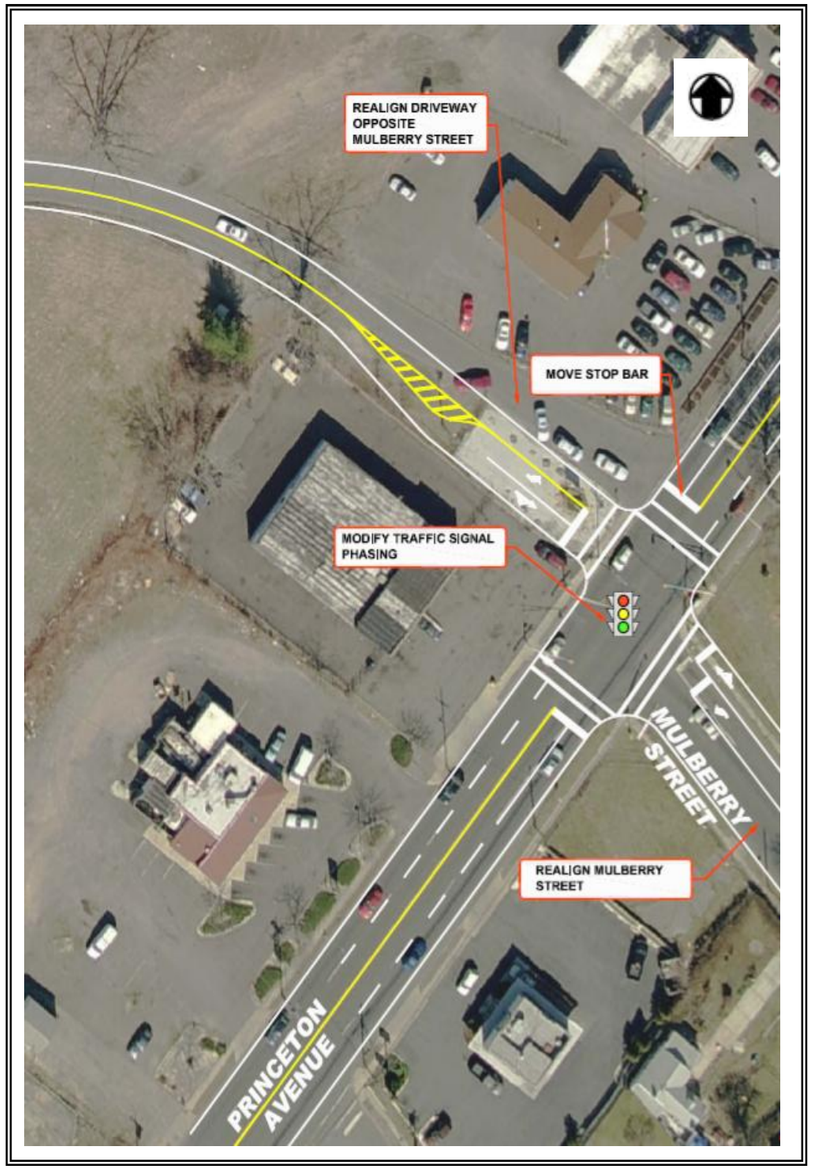
Nature of Improvement:

- Re-align intersection by acquiring property to shift Mulberry Street to the north and shifting TFM driveway to the south within the existing TFM property. Provide dedicated left turn lane for TFM egress.
- Modify signal timing to provide three phases: Princeton Avenue, protected left turns from side streets, and through traffic and right turns from side streets.
- Consider revising access to adjacent properties, particularly AAMCO, requiring cross access easement for access from TFM driveway.

Note: An alternative improvement would be the conversion of Mulberry Street into a one-way street in eastbound direction between Princeton Avenue and Brunswick Avenue. This alternative would have the same benefits as the proposed improvement without the need for property acquisition. The impacts to regional traffic of converting Mulberry Street into a one-way street would need to be evaluated to ensure that adverse traffic conditions would not be created at nearby intersections.

Benefits of Improvement:

- Intersection operating performance will improve substantially.
- Significant improvement can be achieved in intersection safety, especially for traffic movements between Mulberry Street and the TFM Driveway and left turn movements from Princeton Avenue onto TFM Driveway as well as Mulberry Street.
- Availability of additional green signal time for Princeton Avenue traffic movements will Improve traffic flow along the corridor.



Improvement Location: Princeton Avenue north of Spruce Street Intersection

PHASE 1

Improvement Trigger:

- No trigger -- immediate action

Nature of Improvement:

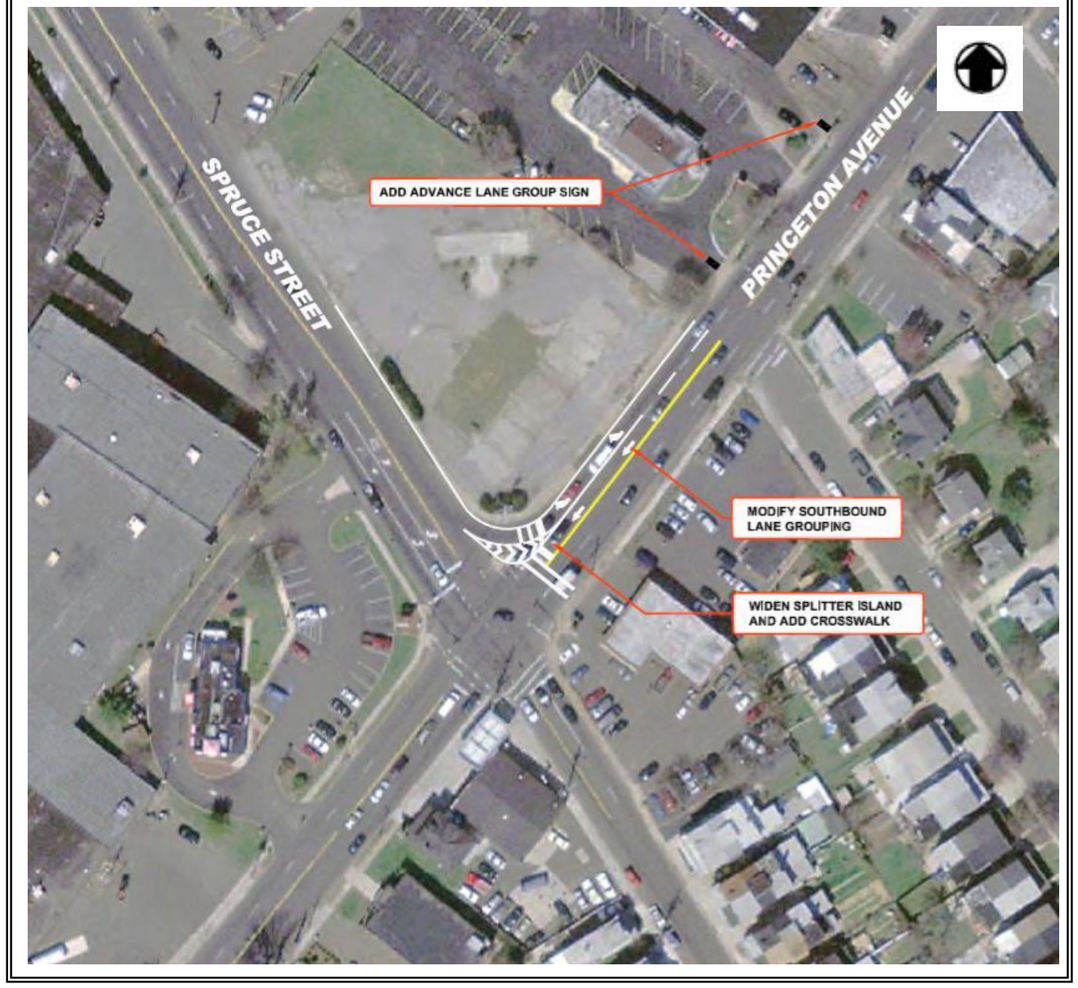
- At the intersection of Princeton Avenue with Spruce Street, re-stripe and make signage changes to designate outer southbound lane for right turns only and inner southbound lane for through trips only.
- Enforce restriction on southbound left turns from Princeton Avenue at this intersection.
- Widen existing splitter island for pedestrian refuge at the northwest corner of this intersection by applying diagonal striping on the existing outer southbound through plus right turn lane at the intersection. Install appropriate pedestrian crossing treatments and signage.
- Install yield control for southbound right turns.
- Add crosswalk across the north leg of intersection, and improve crosswalks across east and south legs. Discourage pedestrians from crossing west leg.

Phase 1: Next Steps

- Review traffic impacts due to modified lane grouping on the southbound Princeton Avenue approach by conducting field studies before and after implementing the improvement.
- Revert back to original lane grouping on the southbound approach if adverse traffic flow impacts are observed. Determine the potential to add a right turn storage lane by acquiring right-of-way from the property at the northwest corner at this intersection.
- If modified southbound lane grouping shows improved traffic flow in southbound direction at this intersection during both AM and PM peak periods, then proceed to Phase 2.

Benefits of Improvement:

- Separating the southbound right turn and through movement trips will result in effective utilization of both southbound lanes.
- Significant improvement in southbound right turn movement performance can be achieved.
- Suggested pedestrian crossing treatments and wider refuge island will provide improved pedestrian safety at the intersection.



Improvement Location: Princeton Avenue Corridor between Spruce St. and Mulberry St.

PHASE 2

Improvement Trigger:

- Confirmation of improved southbound traffic flows with Phase 1 modified lane grouping that has only one southbound through lane

Nature of Improvement:

- Maintain two northbound receiving lanes on Princeton Avenue north of intersection with Spruce Street for a distance of approximately 150 feet. Then merge two northbound lanes on Princeton Avenue into a single northbound lane using appropriate tapers.
- From the location where two northbound lanes merge into a single northbound lane, re-stripe the inner northbound lane to provide a center two-way left turn and/or a left turn storage lane up to the intersection of Mulberry Street.

Phase 2: Next Steps

- Review traffic impacts due to modified lane grouping on the northbound Princeton Avenue by conducting field studies before and after implementing the improvement.
- Revert back to original 2-through lane grouping on northbound Princeton Avenue if adverse traffic flow impacts are observed.
- If modified northbound lane grouping shows improved traffic flow in the northbound direction along the corridor during both AM and PM peak periods, then proceed to Phase 3.

Benefits of Improvement:

- Providing a mutual left turn lane will enhance safe access to adjoining properties on either side of the corridor.
- The mutual left turn lane will also help to eliminate traffic flow interruptions.

Improvement Location: Princeton Avenue Corridor between Olden Ave. and Spruce St.

PHASE 3

Improvement Trigger:

- Confirmation of acceptable northbound traffic flow performance north of Spruce Street with modified lane grouping that has only one northbound through lane

Nature of Improvement:

- Modify northbound lane grouping for the Princeton Avenue section between Olden Avenue and Spruce Street.
- Re-stripe the inner northbound lane to provide a center two-way left turn at mid-block locations and as left turn storage lane at intersections as shown in Figure.
- Place advance lane group signs to inform drivers of the modified lane grouping.
- Review traffic impacts due to modified lane grouping on the northbound Princeton Avenue approach.
- Revert back to original 2-through lane grouping on northbound Princeton Avenue if adverse traffic flow impacts are observed.

Benefits of Improvement:

- Providing northbound left turn storage lanes will improve intersection performance at Olden Avenue as well as the Spruce Street intersection.
- Providing a mutual left turn lane will enhance safe access to adjoining properties on either side of the corridor
- The mutual left turn lane will also help to eliminate traffic flow interruptions.
- Mutual left turn lane would allow conversion of side entrance to Capitol Plaza to permit left turn in.

SPRUCE STREET CORRIDOR

Improvement Location: Spruce Street Corridor between Princeton Ave. & Arctic Parkway

PHASE 1

Improvement Trigger:

- Executed cross-access easement dedications among property owners requiring shared access (e.g., Trenton Farmers' Market, Halo Farm, and the Mercer County Agricultural Extension Service) and memoranda of understanding agreeing to driveway consolidation

Nature of Improvement:

- Re-stripe Spruce Street to a modified four-lane cross-section, providing only one westbound travel lane and two eastbound travel lanes between Princeton Avenue and Arctic Parkway. Convert the current westbound inner lane into a two-way left turn and/or exclusive left turn storage lane as appropriate.
- Consolidate driveways for the Farmers' Market and Halo Farm, leaving one main entry and exit driveway and two right-in and right-out only driveways: one on TFM property abutting the Agricultural Extension parcel line and the other at the existing western Halo Farm exit driveway.
- Install a traffic signal at the new combined main driveway for the Farmers' Market and Halo Farm.
- Consolidate driveways for All Clean and Volk Tire. Consider providing cross-access easement via Tiffany Woods Drive.
- Convert main Capitol Plaza driveway near Halo Farm into right-in and right-out only driveway.
- Install a traffic signal at the Tiffany Woods Road/Capitol Plaza intersection with Spruce Street.

Note: It is essential that driveway consolidations, driveway turning movement restrictions and intersection signalizations suggested above should be coordinated and integrated with internal site design and circulation for the Farmers' Market, Halo Farm and Capitol Plaza sites under consideration.

Phase 1: Next Steps

- Monitor impacts on corridor traffic flows due to eliminating one westbound traffic lane by conducting field studies.

Benefits of Improvement:

- Consolidating driveways can help to improve safety, achieve improved traffic flow along the corridor with less lateral friction, and possibly meet signal warrants.
- Providing appropriate left turn storage lanes will enhance safe access to adjoining properties on either side of the corridor.
- Extending the splitter island at the intersection of Arctic Parkway will streamline traffic flows from south and west.

PHASE 2

Improvement Trigger:

- Implementation of revised zoning along the Spruce Street corridor

Nature of Improvement:

- Convert the Spruce Street corridor between Princeton Avenue and Arctic Parkway into a 3-lane cross-section by converting the eastbound outer through lane into a shoulder. No centerline modification is required. The 3-lane corridor will have one westbound through lane, one eastbound through lane, and a two-way left turn and/or exclusive left turn storage lane based on driveway and intersection locations.

Phase 2: Next Steps

- Monitor impacts on corridor traffic flows due to this conversion by conducting field studies.
- If adverse traffic impacts are observed revert back to the modified 4-lane cross section. If no adverse traffic flow impacts are evident, then proceed to Phase 3.

Benefits of Improvement:

- Converting eastbound outer lane into a shoulder will provide an opportunity to analyze traffic performance of the 3-lane corridor operation without making centerline changes and other capital improvements.
- This phase is a good transition between the existing 4-lane corridor and a future vision of a “complete street” with a 3-lane corridor with bike lanes and sidewalks.

Improvement Location: Spruce Street Corridor between Princeton Ave. & Arctic Parkway

PHASE 3

Improvement Trigger:

- Confirmation of acceptable mid-block traffic flow performance levels along the 3-lane Spruce Street corridor

Nature of Improvement:

- Make centerline changes along the corridor to accommodate 3-lane section with bicycle lanes and sidewalks on both sides of Spruce Street to make it a "complete street."

Phase 3: Next Steps

- Analyze potential for providing an urban roundabout or a traffic signal at the intersection of Tiffany Woods Drive and Spruce Street through Traffic Impact Studies (TIS) for future development/redevelopment along the corridor.

Benefits of Improvement:

- The 3-lane section will transform the Spruce Street corridor into a bicycle and pedestrian friendly multi-modal corridor compatible with neighborhood-scale development, while ensuring acceptable traffic operation levels.
- Improved traffic flow along the corridor can be achieved.

Improvement Location: Spruce Street & Arctic Parkway Intersection

PHASE 1

Improvement Trigger:

- No trigger -- immediate action

Nature of Improvement:

- Re-stripe to provide dedicated left turn lanes in both directions on Spruce Street.
- Expand the splitter island for the Arctic Parkway approach with appropriate striping to channelize eastbound through traffic into the inner lane, and stripe the ramp from Arctic Parkway to channelize right turns into the outer lane.

Benefits of Improvement:

- Providing left turn storage lanes on Spruce Street at this intersection would significantly improve approach performance as well as the overall performance of this intersection.
- Extending the splitter island at the intersection of Arctic Parkway will streamline eastbound traffic flows arriving from south and west.

Improvement Location: Spruce Street & Arctic Parkway Intersection

PHASE 2

Improvement Trigger:

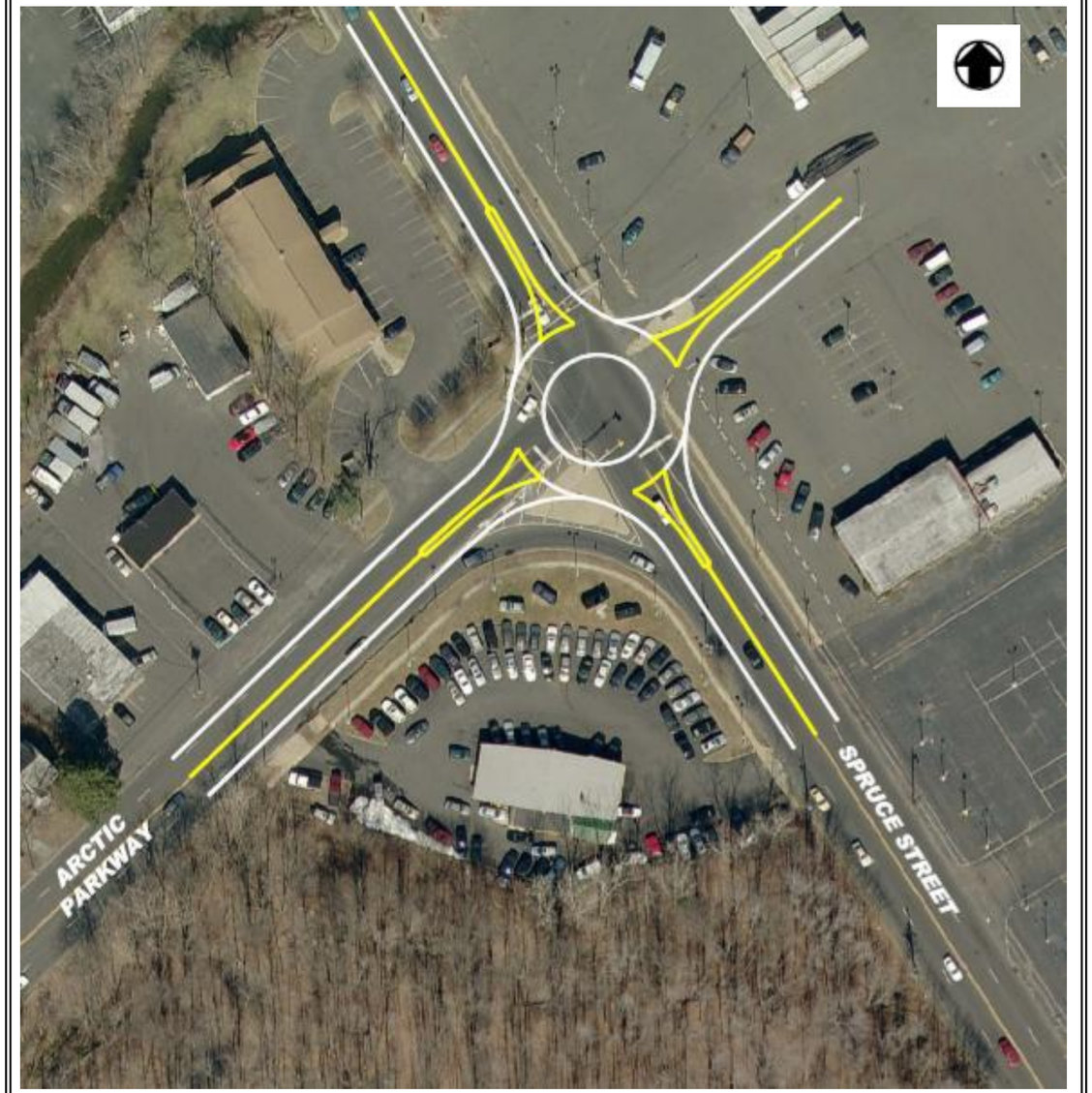
- Proposed development on the Coleman and/or Cahill parcels

Nature of Improvement:

- As a part of the traffic impact study (TIS) for the development, assess feasibility of a roundabout at this intersection as the initially preferred alternative. If feasible, concurrent with development, construct roundabout.

Benefits of Improvement:

- If analysis finds that an urban roundabout is suitable for this location, it will serve as a traffic calming element and possible gateway treatment for the Spruce Street corridor.



Improvement Location: Spruce Street & Prospect Street

Improvement Trigger:

- No trigger -- immediate action

Nature of Improvement:

- Restripe to provide left-turn lanes and shoulders in both directions of Spruce Street, deflecting the centerline in the southerly direction to improve site distance from Old Ewingville Road.
- Stripe shoulders on Spruce Street west of Prospect to reduce risk of collisions with vehicles parked on the street..

Next Steps:

- Assess the need for a traffic signal at this intersection.
- Upon development, install signal and connect Irven Street across former Johnson Trolley right-of-way to the development on 4th Street.

Benefits of Improvement:

- Left turn storage lanes on Spruce Street at this intersection would significantly improve traffic flow through this intersection.
- Striped shoulders would help to separate passive vehicle queuing associated with the gas station at the southeast corner from the active travel lane on Spruce Street.